

Argument to the International Search Opinion
(Formal response to the written opinion of the
International Searching Authority)

TO: Examiner of the European Patent Office as an International
Preliminary Examining Authority

1. Identification of the International Application
PCT/JP2004/011005

2. Applicant

Name: TOYOTA JIDOSHA KABUSHIKI KAISHA
Address: 1, Toyota-cho, Toyota-shi, Aichi 471-8571 Japan
Country of nationality: JAPAN
Country of residence : JAPAN

3. Agent

Name: ITEC INTERNATIONAL PATENT FIRM
Name of signatory: IGAMI Hiroyuki
Capacity: Representative partner
Address: Pola-Nagoya Bldg., 9-26, Sakae 2-chome, Naka-ku.
Nagoya-shi, Aichi 460-0008 Japan

4. Argument

(1) General argument

In the Written Opinion of the International Searching Authority, the Examiner has pointed out the lack of novelty with regard to the invention in accordance with independent claim 1 or 9 over the cited reference D1(DE19837373A), and the lack of inventive step with regard to the invention in accordance with independent claim 1 or 9 over the cited references D2(EP1225110A) or D3(EP1147959A). The Examiner has also pointed out the lack of novelty or inventive step with regard to the invention in accordance with any of dependent claims 2 through 8 over the cited reference D4 (GB2377475A) in addition to the references D1, D2 or D3. The applicant of the invention, however, believes that the invention in accordance with any of independent claim 1 or 9, and dependent claims 2 through 8 has sufficient novelty and inventive step as discussed below. Claims 2 through 8 are dependent of claim 1 and the invention in accordance with dependent claims 2 through 8 has all the constituent features of independent claim 1. The discussion is accordingly focused on the invention in accordance with independent claim 1 and should naturally be recognized as argument against the Examiner's comments with regard to the invention in accordance with dependent claims 2 through 8.

(2) Invention in accordance with Claim 1

Independent claim 1 of the present invention is directed to a vehicle comprising, '(A1) a mechanical braking device that is capable of applying a mechanical braking force to said vehicle', '(A2) a slip detection module that detects a slip caused by spin of drive wheels', '(A3) a slip-down detection module that detects a slip-down of said vehicle', and '(A4) a controller that actuates and controls a power output device to restrict a driving force output to a drive shaft in response to detection of a slip by said slip detection module, while actuating and controlling said mechanical braking device to apply a mechanical braking force to said vehicle in response to detection of a slip-down of said vehicle by said slip-down detection module under restricting the driving force output to the drive shaft.'

(3) Description of Cited References

The cited reference D1 appears to disclose a braking device that is capable of applying a braking force to driven wheels, and techniques of detecting a slip in ABS (Antilock Brake System) or ASR (Anti Spin Regulator), detecting a backward run of a vehicle, and applying a braking force to driven wheels in response to detection of a backward run of the vehicle before or in operation of BASR (ASR by Braking operation).

The cited reference D2 appears to disclose a braking device that is attached to each of the wheels, and a detector that detects a slip-down of a vehicle, and a controller that, in response to detection of the slip-down of the vehicle, executes a slip-down reduction control by the braking device to the wheels which rotate in a same direction as the slip-down direction of the vehicle, while executing a slip reduction control by the braking device to the wheels which rotate in a reverse direction to the slip-down direction of the vehicle supposing that a wheelspin is occurred.

The cited reference D3 appears to disclose a method of restricting a torque of an engine in response to detection of a slip.

(4) Comparison between invention of the present invention and cited references

The cited reference D1 appears to disclose features which correspond to '(A1) a mechanical braking device', '(A2) a slip detection module', and '(A3) a slip-down detection module' in the claimed invention. The cited reference D1, however, does not disclose a feature which corresponds to '(A4) a controller' in the claimed invention. 'A controller' in the invention actuates and controls the mechanical braking device to apply a mechanical braking force to a vehicle in response to detection of a slip-down of the vehicle under restricting the driving force output to the drive shaft from a power output device due to occurrence of a slip. The cited reference D1 discloses a technique of applying a braking force to driven wheels in response to detection of a backward run of the vehicle in operation of BASR. The cited reference D1, however, is different from independent claim 1 of the invention in that it does not

disclose a feature of outputting a mechanical braking force to the vehicle under the restriction of the driving force output to the drive shaft. 'A power output device' of the invention is generally actuated and controlled to output a driving force which corresponds to a step-on amount of the accelerator pedal of the driver to a drive shaft, while in response to detection of a slip, being actuated and controlled to restrict the output of the driving force to the drive shaft regardless of a step-on amount of the accelerator pedal. The restriction of the driving force or the road surface with a gradient may cause an occurrence of a slip-down of the vehicle. Under the restriction of the driving force output to the drive shaft, the driving force output from the power output device is unable to prevent the slip-down of the vehicle. Instead, a mechanical braking force prevents the slip-down of the vehicle by applying the braking force to the vehicle. Accordingly, prior conditions for applying the braking force to the vehicle are basically different between the claimed invention and the reference D1. We thus believe that invention in accordance with independent claim 1 has sufficient novelty and inventive step over the cited reference D1.

The cited reference D2 appears to disclose features which correspond to '(A1) a mechanical braking device', '(A2) a slip detection module', and '(A3) a slip-down detection module' in the present invention. The cited reference D2, however, does not disclose a feature which corresponds to '(A4) a controller' in the present invention. Specifically, the cited reference D2 appears to disclose a controller that, in response to detection of a slip-down of a vehicle, executes a slip-down reduction control by the braking device to the wheels which rotate in a same direction as the slip-down direction of the vehicle, while executing a slip reduction control by the braking device to the wheels which rotate in a reverse direction to the slip-down direction of the vehicle supposing that a wheelspin is occurred. As a similar discussion above, prior conditions for applying the braking force to the vehicle are different between the present invention and the reference D2.

The cited reference D3 appears to disclose a method of restricting a torque of an engine in response to detection of a slip. The reference D3, however, does not teach or suggest a feature of outputting a mechanical braking force to the vehicle in response to detection of a slip under the restriction of the driving

force output to the drive shaft, which is the principal aspect of the invention in accordance with claim 1. We thus believe that the invention in accordance with independent claims 1 has sufficient novelty and inventive step over the cited reference D2, or D3.

As described above, each of the cited references D1, D2 and D3 does not have a constituent feature which correspond to '(A4) a controller' of the invention in accordance with independent claim 1. We thus believe the invention in accordance with independent claim 1 has still sufficient novelty and inventive step over the combination of the cited reference D1, D2 and D3.

Claims 2 through 8 of the present invention are dependent of independent claim 1, and we thus believe that dependent claims 2 through 8 are patentable by the description of the invention in accordance with claim 1. Further, independent claim 10 describes the invention in accordance with claim 1 in the form of another application, or a control method of a vehicle. The discussion above should naturally be applied to claim 10. We thus believe that claim 10 is also patentable over the cited references D1, D2, and D3.

(5) Conclusions

In view of the above, any of the invention in accordance with claims 1 through 9 has sufficient novelty and inventive step. The applicant respectfully requests the Examiner to acknowledge novelty and inventive step of all claims 1 through 9 in the International Preliminary Examination Report.